IBM

Problem Determination During Conversion and Reversion

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About this tutorial

Introduction

The objective of this tutorial is to help you resolve common problems experienced during Informix Dynamic Server (IDS) Migration, that is, upgrades and/or reversion

The reader should be familiar with the functionality of the Informix product family and should be comfortable executing Informix utility commands and SQL statements. This includes backup and restore, fast recovery, object creation, and data access.

Setup

Examples in this tutorial use an IDS engine in a UNIX operating system. They apply to IDS on all operating system platforms.

In order to work through the examples in this tutorial, you should have completed the following tasks:

- IDS version 7.3x and 9.3x is installed (Note: 7.31.UD5 and 9.30.UC3 on Solaris 2.6 were used for preparation of this tutorial.)
- Run dbaccessdemo7 to create the stores database on version 7.31.UD5

Tutorial Conventions Used

When a tool or utility is first mentioned it will be shown in **bold** text.

All command statements and their output will be shown in a `monospaced` font.

Some examples will show specific command options which may change over time, which will always be documented in IDS documentation.

About the author

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Section 1 Getting Ready For Migration

Section 1.1 Checking for available space

IDS 9.x requires 3000 free *log* pages to build the sysmaster database. This operation is logged, creating the requirement for free log pages.   It is therefore important that you make sure that you have enough space in the dbspace, which holds the logical logs. You can add additional free space to the system before initiating migration if you are short of space.

Section 1.2 Saving configuration files

You should always save copies of various configuration files prior to initiating migration. These include:
* $INFORMIXDIR/etc/$ONCONFIG
* $INFORMIXDIR/etc/sm_versions
* $INFORMIXDIR/aaodir/adtcfg
* $INFORMIXDIR/dbssodir/adtmasks
* $INFORMIXDIR/etc/sqlhosts
* $INFORMIXDIR/etc/termcap

Section 1.3 Stop enterprise replication

If you are running enterprise replication and plan to migrate to a new version, there are many things that need to be taken into account.

Refer to the IBM Informix Migration Guide, Section on Migrating to Dynamic Server X.XX with Enterprise Replication.

This will explain how to shutdown ER and any additional steps to be taken to handle the migration of ER.

Section 1.4 Ensure there are no open transactions

Verify that there are no open transactions on the engine that is being upgraded. Do this by issuing the following commands:
```
$ onmode -sy
$ onmode -l
$ onmode -c
$ onmode -ky
$ oninit -s
```

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After you have issued these commands, check the message log file (usually online.log) to confirm that there were no open transactions.

Section 1.5 Verify Data Integrity

You should also verify that the database is in a consistent state, by verifying the data integrity. Do this by issuing the following commands:

```
$ Oncheck -cr
$ Oncheck -ce
$ Oncheck -cD <database name>
$ Oncheck -cD-Y <database name>
$ Oncheck -cc <database name>
```

If there are any integrity failures or corruption, some of these may be fixed by the engine itself. Otherwise, depending on the nature of the corruption, technical support can fix these.

Section 1.6 Backup the database

Before the migration of any environment, it is always advisable to make a backup. The same is true for the Dynamic Server environment. Hence, you should always make a backup of the database prior to migration. Do this with the following commands:

```
$ Onbar -b -L 0    or
$ Ontape -s -L 0
```

Section 1.7 Make sure the database is offline

Finally, make sure that the database is taken offline by issuing the following command:

```
$ Onmode -yuck
```

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Section 2 Migration Results

Section 2.1 Successful migration

Initializing the engine using **oninit** will start the migration. The following messages indicate a successful upgrade from IDS 7.3 to IDS 9.3:

```
11:13:29  Conversion from version 7.3 Started
:
11:13:37  Started the Conversion of the Database Tablespace
11:13:37  The Conversion of the Database Tablespace is Finished
:
11:13:39  Performing internal conversion of disk structures and
databases...
:
11:13:40  Converting database sysmaster ...
:
11:14:19  The database sysmaster has been converted successfully.
:
11:16:07  Booting Language <spl> from module <>
11:16:07  Loading Module <SPLNULL>
:
11:16:59  Converting database sysutils ...
:
11:17:06  External Conversion awaiting sysmaster rebuild prior to
proceeding.
:
11:17:27  Unloading Module <SPLNULL>
:
11:17:32  The database sysutils has been converted successfully.
:
11:17:33  Converting database (dbname) ...
:
11:18:16  The database (dbname) has been converted successfully.
:
11:18:20  The dummy updates succeeded while converting database
(dbname).
:
11:19:00  'sysutils' database built successfully.
:
11:19:02  Internal conversion completed, performing external
conversion...
:
11:19:04  ON-Bar conversion start:
11:19:04  WARNING:Target server version must have a certified
Storage Manager
          installed after conversion/reversion and before bringing
up server.
11:19:04  ON-Bar conversion completed successfully.
11:19:04  Loading Module <SPLNULL>
:
11:19:09  Converting 'syscdr' database ...
11:19:09  'syscdr' conversion completed successfully.
:
```

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```
   11:19:10  Conversion Completed Successfully
```

FYI: Refer to the IBM Informix Migration Guide,   Section on Migrating to Dynamic
Server 9.X with Enterprise Replication for additional necessary steps to be taken to
handle the migration of ER.

Section 2.2 Unsuccessful migration: INFORMIXTMP issues

If you see the following messages during migration, this is due to INFORMIXTMP
issues:

```
        17:43:22  Logical Recovery Started.
        17:43:22  10 recovery worker threads will be started.
        17:43:26  Logical Recovery has reached the transaction cleanup
        phase.
        17:43:26  Logical Recovery Complete.
            0 Committed, 0 Rolled Back, 0 Open, 0 Bad Locks

        17:43:26  Dataskip is now OFF for all dbspaces
        17:43:26  Checkpoint Completed:  duration was 0 seconds.
        17:43:26  Checkpoint loguniq 12223, logpos 0x992018

        17:43:26  Maximum server connections 0
        17:43:26  On-Line Mode
        17:43:26  Performing internal conversion of disk structures and
        databases...
        17:44:48  Error building 'sysmaster' database.
        17:44:48  See '/tmp/buildsmi.10556'.
        17:48:55  Checkpoint Completed:  duration was 0 seconds.
        17:48:55  Checkpoint loguniq 12223, logpos 0x993018

        Contents of /tmp/buildsmi.10556
        27001: Read error occurred during connection attempt.
        The unload of sysmaster prior to upgrade failed
```

In this case, delete all files under /INFORMIXTMP and then perform the operation again.

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Section 3 Reversion

Section 3.1 Reverting from IDS 9.2x to IDS7.3x

In case you are needing to revert from IDS 9.2x to IDS 7.3x, perform the following
command:

```
$ onmode -b 7.3
```

Let's look at an example of an output of revering a database DB1 from IDS 9.2 to IDS
7.3. The output you will see is as follows:

```
This will make all necessary modifications to disk structures so
that the Informix Dynamic Server 2000 space will be compatible
with INFORMIX-OnLine Version 7.3.
Do you wish to continue (y/n)? y
Beginning process of reverting system to 7.3 ...
Checking database DB1 for revertibility ...
Must drop new database (DB1) before attempting reversion.
Iserrno 110
Database DB1 is not revertible ...
Reversion cancelled.
```

In the example above, the database DB1 was created under the 9.x environment, and
therefore cannot be reverted to 7.3. You will have to drop the database before proceeding
with reversion. That is where that backup that was taken prior to migration will come in
handy!

```
If you are reverting a system that is running enterprise replication,
there are additional steps that must be taken to handle the reversion
of ER.
```

Refer to the IBM Informix Migration Guide, Section on Reverting from Dynamic Server
X.XX with Enterprise Replication.

Section 3.2 Example 2 of a potential reversion failure

Reversion may also fail if you have created stored procedures, triggers and/or user
defined functions (UDFs) in the 9.x environment. Note that the same holds true for
reversions from IDS 7.31 to 7.30.

Let's look at an example of what the output will look like if we try to perform a reversion
from IDS 9.x to IDS 7.3 after stored procedures have were created under the 9.x
environment:

```
$ onmode -b 7.3
This will make all necessary modifications to disk structures
so that the Informix Dynamic Server 2000 space will be
compatible with
INFORMIX-OnLine Version 7.3
```

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```
        Do you wish to continue (y/n)? y
        Beginning process of reverting system to 7.3 ...
        Checking database stores7 for revertibility ...
        "db stores7: Must drop all IUS spl/udr's"
        Database stores7 is not revertible ...
        Reversion cancelled.
```

In this case, you will have to drop all stored procedures, triggers and UDF's that were created under 9.x and then perform the reversion.

Section 3.3 Example 3 of a potential reversion failure

A reversion will also fail if there are outstanding in-place alters in the database. In this case, you will have to stop the reversion process and bring up the instance in the original environment. You can bring up the instance in the original environment by either changing the environment to point to the source version binaries or by installing the source version of the engine. You will then have to run a dummy update on the tables identified, by using the format of the command identified in the reversion output. Then, you can redo the reversion.

Here's what the output of the reversion will look like in this case:

```
        Informix:/usr/informix
        $onmode -b 7.3
        This will make all necessary modifications to disk structures
        so that the Informix Dynamic Server space will be compatible
        with INFORMIX-OnLine Version 7.3
        Do you wish to continue (y/n)? y
        Beginning process of reverting system to 7.3 ...
        The following tables have outstanding old version data pages due
        to an
        In-Place Alter Table.  Perform
            UPDATE {table-name} SET {colname} = {colname} WHERE 1=1;
        to clear these pages from the following tables ...
          pkk:"pkutty".tab1
          pkk:"pkutty".tab2
```

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Section 4 Reversion Issues with 9.4

Section 4.1 Large Chunks and Reversion

New features implemented in IBM Informix Dynamic Server 9.40 have imposed some additional considerations regarding potential reversions from this engine version. However, careful planning during the forward migration will allow a subsequent reversion of the entire instance.

The new large chunk feature provides three modes of large chunk support in which the server may be running. These modes are commonly referred to as large chunks unsupported mode, mixed mode and large chunk mode.

In large chunks unsupported mode, any attempts to add a large chunk, a large offset or more than 2047 chunks is prohibited. This mode allows testing of the 9.40 server apart from the large chunk capability without compromising the ability to revert to a previous version of IDS.

In mixed mode, large chunks are supported and writes to these chunks are executed in a new page format. The old format is still used for small chunks. If a large chunk is added to a space, then reversion will not be possible until the space is dropped. Dropping the chunk itself will not satisfy requirements for reversion. The following message is reported when trying to revert under these conditions:

```
Reversion to pre 9.4 not allowed with system having large chunks
or having space that have ever had a large chunk
```

The feature that has enabled large chunks in mixed and large chunk mode changed the instance limit from 2047 chunks to 32766 chunks. . A reversion will fail if any chunk exists that has a chunk number greater than 2047. The following message is when trying to revert and a chunk number greater than 2047 exists:

```
Reversion to pre 9.4 not allowed with system having chunks with
chunk number greater than 2047
```

In large chunk mode, all writes to chunks are executed in the new page format and reversion will fail. The following message is reported when trying to revert while in this mode:

```
Reversion to pre 9.4 not allowed when system is in Exclusive Big
Chunk Mode
```

IDS 9.40 chunk reserved page extents may be allocated from non-root chunks (the root chunk is chunk #1 and is always in the root dbspace). This is a departure from prior versions of IDS. Therefore, during reversion it is necessary during reversion for the

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server to put all the chunk reserved pages back into the primary root chunk. The following message is reported when trying to revert a system with extended chunk reserved pages in non-root chunks of the root dbspace. Here, 12 additional pages of contiguous free pages in the root chunk of the root dbspace are necessary for reversion:

```
Fail to put chunk reserve page extent into root chunk because not
enough continuous space is available in root chunk.  12 space is
required.
```

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Summary

What you should know

You should now be familiar with the conversion and reversion process. Also, you should be familiar with some common errors that are reported during the conversion/reversion process.

For more information

For more information see the IBM-Informix migration guide.